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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/004,524      01/08/98      GEDNEY      R      EN9-91-022R-

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MM32/0712

EXAMINER

SPARKS, D

ART UNIT

PAPER NUMBER

2835

DATE MAILED:

07/12/99

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

*File*  
**Office Action Summary**

Application No.  
**09/004,524**

Applicant(s)  
**Gedney et al.**

Examiner  
**Donald A. Sparks**

Group Art Unit  
**2835**



☒ Responsive to communication(s) filed on Jan 8, 1998

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

**Disposition of Claims**

☒ Claim(s) 1-34 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-34 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

**Application Papers**

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been  
☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

**Attachment(s)**

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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### **DETAILED ACTION**

The instant application having Serial No. 09/004,524 is a Reissue application of U.S. Application No. 07/848,467 now U.S. Pat. No. 5,483,421. The filing date of the Reissue application is January 8, 1998 which is within two years from the date of issue of U.S. Pat. No. 5,483,421. The Reissue application has a total of thirty-four (34) claims pending in the application, there are eight (8) independent claims and twenty-six (26) dependent claims, all of which are ready for examination by the examiner. The examiner acknowledges the applicants' request to have the preliminary amendment dated January 8, 1998 entered into the application.

#### **1. INFORMATION CONCERNING OATH/DECLARATION**

##### **Oath/Declaration**

The applicants' Reissue oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in 37 C.F.R. § 1.63 and 37 C.F.R. § 1.175.

#### **2. INFORMATION CONCERNING DRAWINGS**

##### **Drawings**

The applicants' drawings submitted January 8, 1998 are acceptable for examination purposes, but several deficiencies, observed by the draftsman, exist with respect to their form and are indicated on the PTOL-948 accompanying the instant office action (See M.P.E.P. § 707.07(a)).

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**3. SURRENDER OF THE ORIGINAL LETTERS PATENT**

The examiner acknowledges the applicants' statement of surrendering the original letters patent. However, the original patent, or an affidavit or declaration as to loss or inaccessibility of the original patent, must be received before this reissue application can be allowed. See **37 CFR 1.178**.

**4. ACKNOWLEDGMENT OF AMENDMENT**

**Specification**

The preliminary amendment dated January 8, 1998 requesting an amendment to page 7 of the specification complies with the requirements of **37 C.F.R. § 1.121(b)** and **37 C.F.R. § 1.173**.

**5. REJECTIONS NOT BASED ON PRIOR ART**

**a. DEFICIENCIES IN THE CLAIMED SUBJECT MATTER**

**Claim Rejections - 35 USC § 112 and 251**

-- Claims 13-20 and 26-33 are rejected under 35 U.S.C. 251 as being based upon new matter added to the patent for which reissue is sought. The added material which is not supported by the prior patent is as follows:

In the preliminary amendment dated January 8, 1998, applicants requested that on page 7, lines 7-18, the following amendment:

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“...[A]t least about  $15 \times 10^{-6}$  ppm/ $^{\circ}$ C, preferably at least about  $16 \times 10^{-6}$  ppm/ $^{\circ}$ C...” In addition, the applicants presented claim 13-20 and 26-33 that include, *inter alia*, the limitation that the chip carrier and the board are both made of an organic dielectric material which has a thermal coefficient of expansion of at least about  $15 \times 10^{-6}$  ppm/ $^{\circ}$ C or at least about  $16 \times 10^{-6}$  ppm/ $^{\circ}$ C In support of the above described amendments, the applicants provided, as an attachment to their declaration, a copy of pages from an **Electronic Materials Handbook** documenting that at the time of the applicants' invention the inventors were aware of glass filled epoxies having a TCE of  $15 \times 10^{-6}$  ppm/ $^{\circ}$ C or lower.

The examiner has reviewed the prosecution history in the original application and the evidence submitted in the instant Reissue application in their entirety and has concluded that this evidence fails to sufficiently establish that the applicants' disclosure, as originally filed, supports the newly added subject matter in such a manner that one possessing an ordinary level of skill in the art at the time of the invention would recognize that the applicants invented what is now claimed. (i.e. glass filled epoxies having a TCE of at least about  $15 \times 10^{-6}$  ppm/ $^{\circ}$ C, preferably at least about  $16 \times 10^{-6}$  ppm/ $^{\circ}$ C). The following remarks are provided in support of the examiner's conclusion. The applicants' disclosure, as originally filed, fails to provide support for “...glass filled epoxy FR-4 material having a thermal coefficient of expansion of at least about  $15 \times 10^{-6}$  ppm/ $^{\circ}$ C, preferably at least about  $16 \times 10^{-6}$  ppm/ $^{\circ}$ C...” In fact, in the second paragraph of page 7 of the original specification, it is specifically stated that in the preferred embodiment the chip carrier and the board are both made of glass filled epoxy FR-4 material which has a

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thermal coefficient of expansion of about  $17-20 \times 10^{-6}$  ppm/ $^{\circ}$ C. Furthermore, the prosecution history of the patent reveals that applicants repeatedly distinguished the patent claims over the prior art by arguing that the prior art fails to teach or suggest a chip carrier made of glass filled epoxy FR-4 material which has a thermal coefficient of expansion of at least  $17 \times 10^{-6}$  ppm/ $^{\circ}$ C.

Thus, it is clear from the specification and the prosecution history of the patent that an invention including, *inter alia*, a glass filled epoxy FR-4 material having a thermal coefficient of expansion of at least about  $15 \times 10^{-6}$  ppm/ $^{\circ}$ C, preferably at least about  $16 \times 10^{-6}$  ppm/ $^{\circ}$ C is not supported by the original disclosure and is not indicative from the prosecution history of the patent.

-- Claims 1-20 and 26-33 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In claims 13, 16, 26 and 29, the applicant amended these claims to read that the chip carrier or the circuit board has a thermal coefficient of expansion of at least about  $15 \times 10^{-6}$  ppm/ $^{\circ}$ C. In claims 14, 20 and 30, the applicant amended these claims to read that the chip carrier or the circuit board has a thermal coefficient of expansion of at least about  $16 \times 10^{-6}$  ppm/ $^{\circ}$ C. The applicants' original disclosure (i.e., specification, claims and drawings) fail to provide support for a chip carrier or circuit board having a thermal coefficient of expansion of at least about  $15$  or  $16 \times 10^{-6}$  ppm/ $^{\circ}$ C In fact, on page 5, in the

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second paragraph of the original specification, it is specifically stated that **in the preferred embodiment the chip carrier and the board are both made of glass filled epoxy FR-4 material which has a thermal coefficient of expansion of about  $17-20 \times 10^{-6}$  ppm/ $^{\circ}$ C.**

Because claims 15, 17-19, 27, 28 and 31-33 depend either directly or indirectly from either one of claims 13, 16, 26 and 29, these claims are subject to the same rejection as claims 13, 16, 26 and 29.

Furthermore, claims 1-20 and 26-33 are rejected as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

On page 5, in the second paragraph of the original specification, it is specifically stated that **in the preferred embodiment the chip carrier and the board are both made of glass filled epoxy FR-4 material which has a thermal coefficient of expansion of about  $17-20 \times 10^{-6}$  ppm/ $^{\circ}$ C.** However, claims 1-12 recite the limitation of **at least  $17 \times 10^{-6}$  ppm/ $^{\circ}$ C,** and claims 13-20 and 26-33 recite the limitation of **at least  $15 \times 10^{-6}$  ppm/ $^{\circ}$ C** or **at least  $16 \times 10^{-6}$  ppm/ $^{\circ}$ C.** These claims fail to recite an upper limit and cover values of **thermal coefficient of expansions greater than  $20 \times 10^{-6}$  ppm/ $^{\circ}$ C** which are not supported by the disclosure as originally filed. As required by MPEP § 2163.06 the examiner, in the interest of expeditious prosecution, calls applicants' attention to 37 CFR 1.118.

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-- Claims 13-34 are rejected under 35 U.S.C. 251 as being an improper recapture of claimed subject matter deliberately canceled in the application for the patent upon which the present reissue is based. As stated in *Ball Corp. v. United States*, 221 USPQ 289, 295 (Fed. Cir. 1984):

The recapture rule bars the patentee from acquiring, through reissue, claims that are of the same or broader scope than those claims that were canceled from the original application.

Specifically directed toward claims 13, 14, 16-18, 20 and 26-31 are broader than the original patent claims by the following two limitations: (1) the requirement that the material of the chip carrier be a “glass filled epoxy” has not been included in these claims; and (2) the coefficient of thermal expansion of the chip carrier has been extended to a value of at least about  $15 \times 10^{-6}$  ppm/C° or  $16 \times 10^{-6}$  ppm/C°.

Claims 15, 19, 32 and 33 are broader than the original patent claims by the limitation, in that, the coefficient of thermal expansion of the chip carrier has been extended to a value of at least about  $15 \times 10^{-6}$  ppm/C° or  $16 \times 10^{-6}$  ppm/C°.

Specifically directed toward claims 21-23 and 34 are broader than the original patent claims by the following two limitations: (1) the requirement that the material of the chip carrier is a “glass filled epoxy” has not been included in these claims; and (2) the coefficient of thermal expansion of the chip carrier has been completely left out of these claims.

Claims 24 and 25 are broader than the original patent claims by the limitation, in that, the coefficient of thermal expansion of the chip carrier has been completely left out of these claims.



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It is the position of the examiner that the applicants' claims 13-34 are drawn to an invention surrendered during the prosecution in order to obtain allowance of the original patent claims. The examiner draws attention to the original claims presented in U.S. Patent No. 5,483,421. Original claim 1 corresponds to Reissue claim 13 except that Reissue claim 13 includes the limitation of **an encapsulation material encapsulating said first set of solder connections**. However, this limitation was not considered to be germane to the prior art rejection given in the original patent. This feature was taught by several references cited by the examiner during the prosecution of the patent. A review of the prosecution history of the patent reveals that in the amendment dated May 26, 1993, applicants presented the following amendments to claim 1:

1. (Amended) A package mounting integrated circuit chips onto a circuit board comprising:

- a integrated circuit chip having a surface array of input/output pads on one side thereof which array forms a footprint;
- a chip carrier formed of an organic glass filled epoxy dielectric material having first and second opposite surfaces; said chip carrier having a coefficient of thermal expansion of at least  $17 \times 10^{-6}$  ppm/C°;
- a first set of bonding pads formed on said first surface of the chip carrier and arranged in an array corresponding with the chip footprint;
- a pattern of conductors on said chip carrier connected to accommodate said input/output pads;
- a first set of solder connections interconnecting the input/output pads on the chip to said first set of bonding pads on the chip carrier;
- an encapsulation material encapsulating said first set of solder connections;
- a second set of bonding pads formed on the second surface of the chip carrier arranged in an array;
- electrically conducting vias extend through the chip carrier connecting said first set of bonding pads to the second set of bonding pads;
- a circuit board formed of an organic material having a coefficient of thermal expansion similar to the chip carrier;

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a set of electrical connection sites formed on said circuit board and arranged in a pattern corresponding to the pattern of the array of the second bonding pads on said chip carrier;  
a second set of solder connections interconnecting the pads of said second set of bonding pads on the chip carrier to the connection sites on the circuit board;  
and  
wiring on said circuit board connected to said second set of bonding pads.

Additionally, applicants repeatedly distinguished the patent claims over the prior art by arguing that the prior art fails to teach or suggest a **chip carrier made of glass filled epoxy FR-4 material which has a thermal coefficient of expansion of at least  $17 \times 10^{-6}$  ppm/°C**. In fact, the above argument appear to be the patentees' primary bases for distinguishing the broadest claims, independent claims 1 and 7, from the prior art. Even more compelling is the fact that the Board of Patent Appeals and Interferences ("Board") were persuaded by the patentees' above mentioned arguments and accordingly reversed the obviousness rejection made by the examiner primarily based on the above arguments by the patentees. Portions of the Board's opinion dated June 14, 1995 are stated below:

**Page 5, lines 6-8 of the Decision on Appeal**

*"...The deficiency of Ushifusa is that the CTE of the chip carrier and circuit board are disclosed to be in the range of  $7-13 \times 10^{-6}$  ppm/°C, whereas claim 1 specifically recites the CTE of these two elements to be at least  $17 \times 10^{-6}$  ppm/°C..."*

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**Pages 6 and 7 of the Decision on Appeal**

*“...The bottom line in attempting to combine the teachings of Ushifusa with Europe 1686 is that Ushifusa suggests that the solder joint between the chip carrier and the chip itself would never be able to withstand a chip carrier having a CTE of at least  $17 \times 10^{-6}$  ppm/°C...”*

**Page 8, lines 2-4 of the Decision on Appeal**

*“...Based upon the evidence before us, there is no suggestion to make the chip carrier and circuit board out of material having a CTE of at least  $17 \times 10^{-6}$  ppm/°C...”*

Thereafter, the claims were allowed by the examiner and the application matured into U.S. Patent No. 5,483,421 on January 9, 1996.

Thus, it is clear from the prosecution history that the patentees presented arguments and made changes to the claims with respect to the subject matter of a **chip carrier made of glass filled epoxy FR-4 material which has a thermal coefficient of expansion of at least  $17 \times 10^{-6}$  ppm/°C** and surrendered claim scope that does not include the limitation of a **chip carrier made of glass filled epoxy FR-4 material which has a thermal coefficient of expansion of at least  $17 \times 10^{-6}$  ppm/°C**.

Accordingly, the applicants exclusion from the Reissue claims 13-20 and 26-33, the “**glass filled epoxy FR-4 material**” limitation makes the Reissue claims broader than the patent claims in this way and prohibited by 35 U.S.C. 251.

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Further, the applicants exclusion from the Reissue claims 21-23 and 34 the “**glass filled epoxy FR-4 material**” limitation and the “**glass filled epoxy FR-4 material which has a thermal coefficient of expansion of at least  $17 \times 10^{-6}$  ppm/ $^{\circ}$ C**” limitation makes the Reissue claims broader than the patent claims in this way and is prohibited by 35 U.S.C. 251.

-- Claims 16-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 16, lines 7 and 8, the claim recites “**a chip carrier formed of an organic dielectric material formed of an organic dielectric material...**” The chip carrier being **formed of an organic dielectric material** appears twice. This rejection can be overcome by deleting “**formed of an organic dielectric material**” in line 8 of claim 16.

Further, in claim 16, lines 7-10, it is recited that “**a chip carrier formed of an organic dielectric material formed of an organic dielectric material having a coefficient of thermal expansion similar to the chip carrier...**” It is unclear why it is necessary to recite that the **chip carrier formed of an organic dielectric material should have a coefficient of thermal expansion similar to itself**.

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**6. CLOSING COMMENTS**

**Conclusion**

**a. STATUS OF CLAIMS IN THE APPLICATION**

The following is a summary of the treatment and status of all claims in the application as recommended by **M.P.E.P. § 707.07(I)**:

**a(1) CLAIMS REJECTED IN THE APPLICATION**

Per the instant office action, claims 1-34 have received a first action on the merits and are subject of a first action non-final.

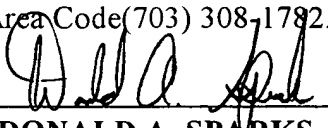
**b. DIRECTION OF FUTURE CORRESPONDENCES**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donald A. Sparks who is normally available from **6:30 A.M. to 5:00 P.M. Monday thru Thursday** and can be reached at the following telephone number: Area Code(703) 308-1756.

**IMPORTANT NOTE:**

If attempts to reach the above noted Examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Leo P. Picard, can be reached at the following telephone number: Area Code(703) 308-0538.

Any inquiry of a general nature or relating to the status of the instant application should be directed to the Group receptionist whose telephone number is Area Code(703) 308-1782.

  
DONALD A. SPARKS  
PRIMARY EXAMINER  
ART UNIT 2835

July 7, 1999